

WHAT IS CLAIMED IS:

- 5     1.     In a network device, a method of performing NAT, comprising:
- maintaining a plurality of routing tables, each of the plurality of routing tables being  
associated with a different virtual private network;
- receiving a packet, the packet including an IP source address and an IP destination  
address, the packet further including information indicating one of the plurality of routing  
10    tables to route the packet;
- performing NAT on the packet;
- identifying one of the plurality of routing tables to route the packet;
- identifying an entry in the one of the plurality of routing tables using the IP  
destination address; and
- 15        routing the packet using the identified routing table entry.
2.     The method as recited in claim 1, wherein each virtual private network is associated  
with a different customer.
- 20    3.     The method as recited in claim 1, wherein the network device is associated with an  
ingress interface of a service provider network.
4.     The method as recited in claim 1, wherein the network device is associated with an  
egress interface of a service provider network.

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5. The method as recited in claim 1, wherein the network device is associated with a service provider network.

6. The method as recited in claim 1, wherein performing NAT on the packet comprises:

5 translating the IP source address from a private address to a public address when the packet is received from a network device in a private network.

7. The method as recited in claim 1, wherein performing NAT on the packet comprises:

10 translating the IP destination address from a public address to a private address when the packet is received from a network device in a public network.

8. The method as recited in claim 7, wherein the network device in the public network provides one or more services to each virtual private network.

15 9. The method as recited in claim 1, further comprising:

receiving a default route advertised by a network device providing one or more shared services available to each virtual private network; and

20 updating each of the plurality of routing tables to include the default route to the network device providing one or more shared services available to each virtual private network.

10. The method as recited in claim 1, wherein the packet includes an MPLS tag indicating a virtual private network, and wherein identifying one of the routing tables comprises:

ascertaining the virtual private network from the MPLS tag; and

5 identifying the one of the routing tables associated with the virtual private network.

11. The method as recited in claim 10, wherein the MPLS tag further identifies the network device responsible for performing NAT and routing the packet.

10 12. The method as recited in claim 1, wherein the packet includes an MPLS tag indicating a virtual private network, and wherein performing NAT on the packet comprises:

ascertaining the virtual private network from the MPLS tag;

identifying an entry in a translation table including the IP source address, the IP destination address, and a virtual private network identifier identifying the virtual private  
15 network; and

performing NAT on the packet using the entry in the translation table.

13. The method as recited in claim 12, wherein identifying one of the routing tables to route the packet comprises:

20 identifying the one of the routing tables from the entry in the translation table.

14. In a network device, a method of performing NAT, comprising:

maintaining a plurality of sets of routing information, each of the sets of routing information being associated with a different virtual private network;

receiving a packet, the packet including an IP source address and an IP destination address, the packet further including information indicating one of the plurality of routing tables to route the packet;

performing NAT on the packet;

5 identifying an entry in one of the sets of routing information using the IP destination address; and

routing the packet using the identified routing table entry.

15. The method as recited in claim 14, wherein each of the sets of routing information  
10 corresponding to each virtual private network is stored in a separate routing table.

16. The method as recited in claim 14, wherein each of the sets of routing information  
corresponding to each virtual private network is stored in a single routing table, wherein  
each entry in the routing table includes a VPN identifier identifying the corresponding  
15 virtual private network.

17. The method as recited in claim 14, further comprising:  
receiving a default route advertised by a network device providing one or more  
shared services available to each virtual private network; and  
20 updating the sets of routing information to include the default route to the network  
device providing one or more shared services available to each virtual private network.

18. The method as recited in claim 17, wherein updating the sets of routing information  
comprises:

updating a single routing table to include the default route.

19. The method as recited in claim 18, wherein the single routing table is dedicated to storing default routes to shared services available to each virtual private network.

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20. The method as recited in claim 18, wherein the single routing table stores the sets of routing information.

21. The method as recited in claim 17, wherein updating the sets of routing information  
10 comprises updating a plurality of routing tables to include the default route, each of the plurality of routing tables being associated with a different virtual private network.

22. A computer-readable medium storing thereon computer-readable instructions for performing NAT in a network device, comprising:

15 instructions for maintaining a plurality of routing tables, each of the plurality of routing tables being associated with a different virtual private network;

instructions for receiving a packet, the packet including an IP source address and an IP destination address, the packet further including information indicating one of the plurality of routing tables to route the packet;

20 instructions for performing NAT on the packet;

instructions for identifying one of the plurality of routing tables to route the packet;

instructions for identifying an entry in the one of the plurality of routing tables using the IP destination address; and

instructions for routing the packet using the identified routing table entry.

23. A network device adapted for performing NAT, comprising:

means for maintaining a plurality of routing tables, each of the plurality of routing tables being associated with a different virtual private network;

5 means for receiving a packet, the packet including an IP source address and an IP destination address, the packet further including information indicating one of the plurality of routing tables to route the packet;

means for performing NAT on the packet;

means for identifying one of the plurality of routing tables to route the packet;

10 means for identifying an entry in the one of the plurality of routing tables using the IP destination address; and

means for routing the packet using the identified routing table entry.

24. A network device adapted for performing NAT, comprising:

15 a processor; and

a memory, at least one of the processor and the memory being adapted for:

maintaining a plurality of routing tables, each of the plurality of routing tables being associated with a different virtual private network;

20 receiving a packet, the packet including an IP source address and an IP destination address, the packet further including information indicating one of the plurality of routing tables to route the packet;

performing NAT on the packet;

identifying one of the plurality of routing tables to route the packet;

identifying an entry in the one of the plurality of routing tables using the IP destination address; and

routing the packet using the identified routing table entry.